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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

CORRESPONDENCE

MAR - 7 1996

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: OCCUPATIONAL AND RESIDENTIAL EXPOSURE ASSESSMENT AND RECOMMENDATIONS FOR THE REREGISTRATION ELIGIBILITY DOCUMENT FOR CHLORPYRIFOS (Non-Agricultural Uses)

TO: Michael Metzger, Chief
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Please find the OREB review of chlorpyrifos.

DP Barcode: D203766

Pesticide Chemical Codes: 059101

EPA Reg. Nos.: 62719-47, 464-571,

EPA MRID Nos.: 40094001, 420084-01, 430135-01

LUIS Report Date: None

PHED: Yes

OCCUPATIONAL AND RESIDENTIAL EXPOSURE CHAPTER

In this document, which is for use in EPA's development of the chlorpyrifos Reregistration Eligibility Decision Document (RED), EPA presents the results of its review of the potential human health effects of occupational and residential exposure to chlorpyrifos. Included is a discussion of the adequacy of the occupational and residential exposure data that have been submitted in support of the reregistration of chlorpyrifos.

Occupational and Residential

An occupational and/or residential exposure assessment is required for an active ingredient if (1) certain toxicological criteria are triggered and (2) there is potential exposure to handlers (mixers, loaders, applicators, etc.) during use or to persons entering treated sites after application is complete.

Use Summary

Use Patterns

Chlorpyrifos, O,O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate, is an insecticide formulated as a wettable powder (containing 50% a.i.), emulsifiable concentrates (41.5-42.8%), dust (containing 0.1-1.0% a.i.), granular (containing 0.075%-15% a.i.), bait (containing 0.5% a.i.), flowables (containing 30% a.i.), impregnated material (containing 0.5-10% a.i.), pelleted/tableted (containing 0.5-1.0% a.i.), pressurized liquids (0.9-3.8% a.i.), and microencapsulated (0.5-2.5% a.i.).[1]

Occupational-use products and homeowner-use products

At this time some products containing chlorpyrifos are intended primarily for homeowner use, and some are intended primarily or solely for occupational use. This review addresses non-agricultural uses only. Agricultural uses will be addressed in a separate memo.

Summary of Toxicity Concerns Impacting Occupational and Residential Exposures

Acute Toxicity Categories

Guideline studies for acute toxicity indicate that the technical grade active ingredient for chlorpyrifos is classified as category II for acute oral toxicity, category II for acute dermal toxicity, category II for acute inhalation toxicity, category III for skin irritation potential, and category III for eye irritation potential.[1] It is not classified as a skin sensitizer. Chlorpyrifos has a vapor pressure of 1.87 x 10^{-5}mm Hg at 20° C.

Other Endpoints of Concern

The *Toxicology Endpoint Selection Document* dated August 15, 1994 (1), indicates that there is a toxicological end-point of concern for chlorpyrifos. The short term and intermediate term end-point used in the occupational/residential exposure assessment is a NOEL of 0.03 mg/kg/day from a daily oral human volunteer study.[1] One percent dermal absorption was used for the risk calculations[2]. Chlorpyrifos is classified as a Group E carcinogen.[1]

Handler Exposures & Assumptions

EPA has determined that there is a potential exposure to mixers, loaders, applicators, or other handlers during usual use-patterns associated with chlorpyrifos. Based on the use patterns and potential exposures described above, 10 exposure scenarios were identified for chlorpyrifos for non-agricultural uses.

Mixer/loader/applicator (M/L/A) exposure data for chlorpyrifos were required for a reregistration data call in (DCI) issued September 18, 1991 during the reregistration process, since one or more toxicological criteria had been triggered.

Requirements for applicator exposure studies are addressed by Subdivision U of the Pesticide Assessment Guideline. Applicator exposure data were required previously by the Agency. The Pesticide Handlers Exposure Database (PHED), Version 1.1 was used for several scenarios. In addition, studies from the scientific literature were used for other situations.

Risk From Handler Exposures

Margins of exposure (MOEs) for occupational exposure were calculated for handlers for short-term (one to seven days) and intermediate-term (one week to several months) exposure, depending on the scenario.

Margin of Exposure (MOE) is calculated by dividing the NOEL by the daily dermal dose.

The margins of exposure (MOEs) were based on a NOEL from human studies. The target MOE under these conditions is 10 (1).

MIXERS/LOADERS/APPLICATORS

The following study monitoring residential application of chlorpyrifos was submitted by the registrant.

Vaccaro, J.R. (1986) Evaluation of Airborne and Whole Body Exposure of Lawn Care Specialists to Chlorpyrifos During Routine Treatment of Turf. Accession No. 400260-01

The following non-agricultural applications were considered:

(1) **indoor crack and crevice or broadcast application** (PPE: chemical-resistant gloves plus long-sleeve shirt and long pants) It was assumed that a commercial applicator uses the material 10 times per day, each time dispensing 0.13 lbs of chlorpyrifos.

(2) **application of a ready-to-use liquid with an aerosol can** (plus long-sleeve shirt and long pants, no gloves). The exposure assessment was derived from PHED V1.1. It was assumed that a homeowner applicator would spray one entire 16 ounce can of a 1 percent spray in a day (0.01 lb ai per day). Commercial applicators were assumed to apply 10 cans per day (0.1 lb ai per day).

(3) **bulbous duster or shaker can**: OREB has no data monitoring exposures from chlorpyrifos application using a duster. Exposures were derived from 24 replicates obtained from a study in the scientific literature in which a dust formulation was applied to a home garden. An assumption of 0.02 lbs ai was used based on the amount of dust handled in each 15 minute replicate.

(4) **affixing dog/cat collars and tags** - OREB has no data addressing the potential exposures of individuals affixing dog/cat collars and tags. Human exposure would be expected to be relatively low but cannot be quantified at this time. It would be expected that exposures from this scenario would not exceed those from crack and crevice or aerosol treatments.

(5) **application of pet shamoos and dips:** OREB has no data addressing the exposures of applicators or pets from the use of pet shampoos or dips and cannot provide a quantified exposure estimate at this time.

(6) **granular bait application by hand** (PPE: chemical-resistant gloves plus long-sleeve shirt and long pants) could not be quantified. Exposure was considered to be negligible based on analysis of a single study from PHED V1.1 in which over 90 percent of the samples contained no detectable material. Any quantification would be based almost exclusively on the level of detection for a different compound.

(7) **loading granular formulation and applying with belly-grinder equipment or a push-type spreader** (PPE: chemical-resistant gloves plus long-sleeve shirt and long pants). Subsetting of data from PHED V1.1 yielded a dataset containing 55 replicates of high quality (C grade or better data). Applicators were assumed to use the same amount of material that was dispensed in the selected studies.

(8) **mixing/loading and applying with termite-injection equipment for subterranean termite control** (PPE: chemical-resistant gloves plus long-sleeve shirt and long pants). Subsetting of data from PHED V1.1 yielded a dataset containing with 17 replicates from a single high quality study. An assumption of one application per day with an average of 8.2 lbs of chlorpyrifos handled at each site was used based on an air monitoring study reviewed by the Agency in 1988.

(9) **paintbrush application:** exposures of applicators using paintbrushes were derived from data located the Pesticide Handlers Exposure Database (PHED), Version 1.1. Selection of paintbrush application yielded a subset with 15 replicates from a single study. Two scenarios were evaluated; one assuming the workers wear long sleeves, long sleeved shirts and no gloves; and the other assuming short sleeves, long pants and no gloves.

(10) **outdoor low pressure handwand application:** (PPE: chemical-resistant gloves plus long-sleeve shirt and long pants for commercial applicators, various clothing scenarios for resident application). Exposure estimates were derived from a registrant study in which workers were monitored during commercial lawn care application. Clothing was assumed to offer 50 percent protection and gloves 90 percent protection. Commercial applicators were assumed to spray for 8 hours per day and residents for 45 minutes per day.

Table 1 presents the exposure scenarios and exposure calculations using the above data sources for the non-agricultural uses of chlorpyrifos. Children are not included in this table since children would not be expected to apply this material, although they might be exposed after application.

RESIDENTIAL POST APPLICATION EXPOSURE

EPA used a short-term and intermediate-term NOEL of 0.03 mg/kg/day, to calculate the potential risk to persons from post-application exposures to chlorpyrifos and assumed average body weights of 70, 60, and 10.2 kg for adult males, females, and children, respectively. Exposure estimates were based on biological monitoring data and hand/oral exposure derived from handwash data. In neither case were samples collected beyond 48 hours after application, making extended exposure analyses impossible. These estimates are presented in Tables 2 and 3.

Table 1. Estimated Exposures of Individuals Mixing/loading and Applying Chlorpyrifos in the Residential Environment. Differences in body surface area and respiratory rate between males and females were not included in the calculations.

Application Scenario	Clothing Scenario	Exposure (mg/lb ai)		Lb ai Handled	Exposure (mg/kg/day)		MOE		Data Source
		Dermal	Respiratory		Adult Male (70 kg)	Adult Female (60 kg)	Adult Male	Adult Female	
Indoor Broadcast/Crack and Crevice (Commercial)	LS, LP, GLOVES	8.1	0.92	1.3	0.0186	0.0217	1.61	1.38	PHED 1.1
	LS, LP, GLOVES with resp (90%)	8.1	0.092	1.3	0.0032	0.0037	9.38	8.11	PHED 1.1
Aerosol Spray Can (Homeowner)	No Clothing	479	1,1	0.01	0.0008	0.001	37.5	30	PHED 1.1
	SS, LP, No Gloves	233	1.1	0.01	0.0005	0.0006	60	50	PHED 1.1
	LS, LP, No Gloves	187	1.1	0.01	0.0004	0.0005	75	60	PHED 1.1
Aerosol Spray Can (Commercial Applicator)	LS, LP, No Gloves	187	1.1	0.1	0.004	0.005	7.5	6	PHED 1.1
Ready to Use Dust (Shaker Can or Bulbous Duster) - Homeowner Product	No Clothing	5000	0.0019	0.024	0.0171	0.02	1.75	1.5	Kurtz & Bode
	SS, LP, No Gloves	2200	0.0019	0.024	0.0075	0.0088	4	3.41	Kurtz & Bode
	LS, LP, Gloves	2000	0.0019	0.024	0.0069	0.008	4.35	3.75	Kurtz & Bode
Dog & Cat Flea Collars	NA	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Pet Dips/Shampoos	NA	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Granular Bait (Hand Application)	LS, LP, Gloves		Not Calc.	Not Calc.	Not Calc.	Not Calc.	Not Calc.	Not Calc.	PHED 1.1

Table 1. Estimated Exposures of Individuals Mixing/loading and Applying Chlorpyrifos in the Residential Environment. Differences in body surface area and respiratory rate between males and females were not included in the calculations.

Application Scenario	Clothing Scenario	Exposure (mg/lb ai)		Lb ai Handled	Exposure (mg/kg/day)		MOE		Data Source
		Dermal	Respiratory		Adult Male (70 kg)	Adult Female (60 kg)	Adult Male	Adult Female	
Granular Bait (Belly Grinder or Push-type Spreader)	No Clothing	303	0.029	0.97	0.0424	0.0495	0.71	0.61	PHED 1.1
	SS, LP, No Gloves	95	0.029	0.97	0.0136	0.0158	2.21	1.9	PHED 1.1
	LS, LP, No Gloves	85	0.029	0.97	0.0122	0.0142	2.46	2.11	PHED 1.1
	LS, LP, Gloves	17	0.029	0.97	0.0028	0.0032	10.71	9.38	PHED 1.1
Termiticide Application	LS, LP, Gloves	0.36	0.0019	8.2	0.0006	0.0008	50	37.5	PHED 1.1

Table 1 (Continued). Estimated Exposures of Individuals Mixing/loading and Applying Chlorpyrifos in the Residential Environment. Differences in body surface area and respiratory rate between males and females were not included in the calculations.

Application Scenario	Clothing Scenario	Exposure (mg/hr)		Hours of Exposure	Exposure (mg/kg/day)		MOE		Data Source
		Dermal	Respiratory		Adult Male (70 kg)	Adult Female (60 kg)	Adult Male	Adult Female	
Paint Brush (Exposures based on time due to lack of use information)	SS, LP, No Gloves	10.2	0.012	8 Hrs	0.013	0.0152	2.31	1.97	PHED 1.1
	LS, LP, No Gloves	7.9	0.012	8 Hrs	0.0104	0.0121	2.88	2.48	PHED 1.1
Handgun Application to Turf - Commercial	LS, LP, Gloves	27.8	0.0033	8 Hours	0.032	0.037	0.94	0.8	Vaccaro
Handgun Application to Turf - Resident	No Clothing	70.8	0.0033	45 min	0.0076	0.0089	3.9	3.4	Vaccaro
	SS, LP, No Gloves	58.4	0.0033	45 min	0.0063	0.0074	4.7	4.1	Vaccaro
	LS, LP, No Gloves	44.8	0.0033	45 min	0.0048	0.0056	6.2	5.4	Vaccaro
	LS, LP, Gloves	27.8	0.0033	45 min	0.003	0.0035	10	8.6	Vaccaro

NOEL = 0.030 mg/kg/day

LP = Long Pants
SS = Short Sleeve Shirt
LS = Long Sleeve Shirt

Dermal Absorption = 1 percent
BW Male = 70 kg
BW Female = 60 kg

Post-Application Exposures & Assumptions

EPA has determined that there is potential exposure to the general public (adults and children) following applications at residential and public sites - indoors and outdoors. Post-application exposure data were required for chlorpyrifos in a reregistration DCI issued September 19, 1991 during the reregistration process, since, at that time, one or more toxicological criteria had been triggered for chlorpyrifos. The estimates of exposure are presented in Table 2.

The following studies were submitted by the registrant:

- MRID No. 40094001 Airborne Chlorpyrifos Concentrations Measured During and Following Applications of Dursban TC Insecticide to Residential Dwellings. GH-P 1310.

- MRID No. 420084-01 Vaccaro et al. Evaluation of Dislodgeable Residues and Absorbed Doses of Chlorpyrifos to Crawling Infants Following Indoor Broadcast Applications of a Chlorpyrifos Based Emulsifiable Concentrate. Study ID No. DECO-HEH 2.1-1-182(95).

- MRID No. 430135-01 Vaccaro et al. Chlorpyrifos: Exposure to Adults and Children Upon Reentry to Domestic Lawns, Following Treatment with a Chlorpyrifos-Based Mixture. Study ID No. DECO-HEH2.1-1-182(121).

INDOOR POST-APPLICATION EXPOSURES.

Broadcast Treatment

The results of the broadcast study were calculated using data from the registrant's study (MRID No. 420084-01). The study monitored six adult volunteers performing child-like activities for 4 hours on a carpet after broadcast treatment with a 0.5 percent chlorpyrifos spray. The activities commenced immediately after the carpet was dry. It is uncertain how well the 4 hour activities reflect those that normally occur in the home environment. Exposures were monitored by measurement of urinary metabolite concentrations.

Dislodgeable residues were determined by dragging a weighted patch ("DOW Sled")over the treated surface at various time intervals. It must be recognized that the "Sled" dosimeter represents new technology and that the relationship between dragging a denim patch and transfer to actual human skin has not been established. Total residues tended to dissipate within approximately 12 hours to a relatively constant level of about 4000 μg per ft^2. It is unknown how long this level remains before additional dissipation occurs. Even though the total residues level off after about 12 hours, the transfer coefficients continued to decline over time. The decrease in transfer coefficient, even though absolute residue levels tend to remain fairly constant for a period of time, indicated that the remaining residues probably

contribute a negligible amount to the exposure that would occur following a subsequent application, assuming that a few days had passed between applications.

The registrant attempted to address the issue of possible exposure of children through hand/oral contact following contact with a treated surface by washing the hands and assuming that all of the material rinsed from the hands was available for oral ingestion. There are no quantitative data addressing the possible exposure via the hand/oral route currently available. The assumption was considered to provide a reasonable estimate of exposure via this route.

Crack and Crevice Treatment

Crack and crevice treatment, which is much more directed, would be expected to yield lower exposures than those from broadcast treatment. The exposures from the broadcast study were adjusted to estimate the exposures of children following crack and crevice treatment using a study from the scientific literature (3). It was estimated that the residues on non-target surfaces would be approximately 14 percent of those resulting from broadcast treatment, based on deposition determined in the registrant submitted study compared to deposition from the crack and crevice literature study.

OUTDOOR POST APPLICATION EXPOSURES

A second submitted study (MRID No. - 430135-01) monitored individuals performing activities on turf following broadcast treatment with chlorpyrifos. Eight volunteers performed activities intended to mimic a child walking/running, sleeping, crawling, and sitting on the turf. The subjects performed the activities for a period of four hours, beginning when the turf had dried, four hours after application. Exposures were monitored as described above and the same assumptions used for estimation of hand/oral exposure. The uncertainties are the same for this scenario as presented above for the broadcast application to carpets. Dislodgeable residues were monitored over the 48 hour period following drying of the turf. No data are available for further dissipation after this time. The exposures presented in Table 2 represent the results of a single exposure event immediately after drying of the treated turf. Due to the design of the biological monitoring study, it was not possible to derive separate exposure values for subsequent days.

EXPOSURES FROM TREATMENT FOR SUBTERRANEAN TERMITE CONTROL

A study submitted by the registrant (MRID No. 40094001) was used to determine the respiratory exposures of the residents of homes treated with chlorpyrifos for subterranean termite control. Thirty two homes, 8 each of plenum, crawlspace, slab, and basement construction, were treated at several different locations throughout the country. Applications were made by licensed professional applicators using conventional equipment and following the label instructions. Air in the kitchen, one bedroom, and the basements of basement construction homes was monitored before treatment and at various intervals after application for one year.

Treatment of homes with chlorpyrifos for subterranean termite control appears to result in a slightly increased exposure over background levels soon after treatment. Exposures return to background levels within a few days after the application for slab, crawlspace, and the first floor rooms of basement homes. Basement showed higher concentrations of the chemical than first floor rooms. The concentrations in basements declined slowly over time, reaching first floor levels within one year after application. Treatment of plenum structures appears to result in airborne concentrations in first floor rooms that are slightly higher than those observed in other construction types. These increased levels return to background within a few months after application.

Adults and children were assumed to be in the residence for 15 hours per day and 24 hours per day, respectively. The resulting respiratory exposures are presented in Table 3.

INSUFFICIENT DATA

- dog/cat collars and tags
- ready-to-use pump sprayer
- dog dip and shampoo
- hand-held sprinkler can

Risk From Post-Application Exposures

The registrant submitted three studies addressing post-application exposures. Air levels following termiticide treatment were monitored for one year. Two additional studies, one addressing broadcast treatment of a carpet and another addressing lawn application were also submitted. In the case of the carpet study, dislodgeable residues declined within 48 hours, although total residues remained fairly constant. In the lawn care study, no clear decline in residues was evident during the 48 hours after the turf had dried, possibly because of technical problems associated with using a drag over a turfgrass medium. Since one of the key issues revolves around the use of an acute versus long term NOEL. The registrant should conduct dislodgeable residue studies on turf for a period of more than 48 hours and with more sample collection to allow the derivation of a regression for decline of dislodgeable residues over time.

Table 2. Estimates of Post-Application Exposures Following Broadcast or Crack and Crevice Treatment in the Residential Environment.

Reentry Scenario	Exposure (mg/kg/day)			MOE			Data Source
	Adult Male (70 kg)	Adult Female (60 kg)	Child (10.2 kg)	Adult Male	Adult Female	Child	
Broadcast Treatment (Indoors)							MRID 420084-01
Day 1:	0.012	No Separate Calculation	0.023	2.5	2.5	1.3	
Day 2:	No Data	No Data	0.014	No Data	No Data	2.1	
Crack & Crevice							MRID 420084-01,
Day 1:	0.0017	0.0017	0.0032	17.6	17.6	9.4	Wright & Leidy
Day 2:	No Data	No Data	0.002	No Data	No Data	No Data	
Broadcast Application (Lawn)							MRID 430135-01
Day 1:	0.0063	No Separate	0.008	4.8	4.8	3.8	
Day 2:	No Data	Calculation	No Data	No Data	No Separate Calculation	No Data	

NOEL = 0.030 mg/kg/day

(SECTION IV - REGULATORY POSITION AND LABELING RATIONALE)

Personal Protective Equipment/Engineering Controls for Handlers

Homeowner-Use Products

EPA is not establishing minimum (baseline) handler PPE (other than long-sleeve shirt, long pants, socks, and shoes) for chlorpyrifos end-use products that are intended primarily for homeowner use, since the Agency anticipates that the frequency, duration, and degree of exposure by such users do not warrant such risk mitigation measures.

Homeowner-Use Products (NonWPS Uses)

Since EPA has concerns about post-application exposures to persons following homeowner applications of chlorpyrifos, it is establishing entry restrictions for homeowner uses of chlorpyrifos end-use products. For specific language refer to Section V of this document.

Additional Labeling Requirements

The Agency is requiring additional labeling statements to be located on all end-use products containing chlorpyrifos. For the specific labeling statements, refer to Section V of this document.

SECTION V - LABELING REQUIREMENTS FOR END-USE PRODUCTS

Occupational/Residential Labeling

Products Intended Primarily for Occupational Use

Entry Restrictions

Sole-active-ingredient end-use products that contain chlorpyrifos must be revised to adopt the entry restrictions set forth in this section. Any conflicting entry restrictions on their current labeling must be removed.

Multiple-active-ingredient end-use products that contain chlorpyrifos must compare the entry restrictions set forth in this section to the entry restrictions on their current labeling and retain the more protective. A specific time-period in hours or days is considered more protective than "sprays have dried" or "dusts have settled."

Table 3. Estimated Respiratory Exposures on Residents of Homes Treated with Chlorpyrifos for Subterranean Termite Control. Estimates were derived from a registrant-submitted air monitoring study (MRID No. 40094-00).

Reentry Scenario	Air Conc. $\mu g/m^3$	Exposure (mg/kg/day)			MOE		
		Adult Male (70 kg)	Adult Female (60 kg)	Child (10.2 kg)	Male	Female	Child
Termiticide -Crawlspace							
Day 1	0.31	0.00006	0.00004	0.00004	500	750	750
Days 2-7	0.33	0.00006	0.00004	0.00004	500	750	750
Days 8-30	0.26	0.00005	0.00003	0.00003	600	1000	1000
Days 31-90	0.34	0.00006	0.00005	0.00004	500	600	750
After 90	0.15	0.00003	0.00002	0.00002	1000	1500	1500
Termiticide -Basement							
Day 1	1.36	0.00025	0.00018	0.00016	120	167	188
Days 2-7	0.77	0.00014	0.0001	0.00009	214	300	333
Days 8-30	0.7	0.00013	0.00009	0.00008	231	333	375
Days 31-90	0.41	0.00008	0.00005	0.00005	375	600	600
After 90	0.29	0.00005	0.00004	0.00003	600	750	1000

Table 3. Estimated Respiratory Exposures on Residents of Homes Treated with Chlorpyrifos for Subterranean Termite Control. Estimates were derived from a registrant-submitted air monitoring study (MRID No. 40094-00).

Reentry Scenario	Air Conc. $\mu g/m^3$	Exposure (mg/kg/day)			MOE		
		Adult Male (70 kg)	Adult Female (60 kg)	Child (10.2 kg)	Male	Female	Child
Termiticide -Plenum							
Day 1	1.6	0.0003	0.00021	0.00019	100	143	158
Days 2-7	1.56	0.00029	0.00021	0.00018	103	143	167
Days 8-30	1.37	0.00025	0.00018	0.00016	120	167	188
Days 31-90	0.23	0.00004	0.00003	0.00003	750	1000	1000
After 90	0.17	0.00003	0.00002	0.00002	1000	1500	1500
Termiticide -Slab							
Day 1	0.87	0.00016	0.00012	0.0001	188	250	300
Days 2-7	0.46	0.00009	0.00006	0.00005	333	500	600
Days 8-30	0.18	0.00003	0.00002	0.00002	1000	1500	1500
Days 31-90	0.32	0.00006	0.00004	0.00004	500	750	750
After 90	0.11	0.00002	0.00001	0.00001	1500	3000	3000

NOEL = 0.030 mg/kg/day

Respiratory Volume (Male) 13 m^3/day
Respiratory Volume (Female) 8.0 m^3/day
Respiratory Volume (Child) = 1.2 m^3/day

Products Intended Primarily for Homeowner Use

Entry restrictions --

The Agency is establishing the following entry restrictions for all homeowner uses of chlorpyrifos end-use products:

For spray applications:
"Do not allow persons or pets to enter the treated area until sprays have dried."

Following applications of dog dips or shampoos, granular baits, pet ear tags or collars:
EPA is establishing no entry restriction.

Other Labeling Requirements

Products Intended Primarily for Occupational Use

The Agency is requiring the following labeling statements to be located on all end-use products containing chlorpyrifos that are intended primarily for occupational use.

Application restrictions (other than mosquito-fogger, dog-dip or -shampoo, and pet collar applications)

"Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application."
User safety recommendations

- "Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet."

The following user safety recommendation is required for all end-use products EXCEPT those formulated as dog/cat collars:

- "Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing."

The following user safety recommendation is required only for those uses where PPE (other than long-sleeve shirt, long pants, shoes and socks) is required on the end-use product label

- "Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing."

Products Intended Primarily for Home Use

Application restrictions

"Do not apply this product in a way that will contact any person or pet, either directly or through drift. Keep people and pets out of the area during application."

User safety requirements

"Follow manufacturer's instructions for cleaning/maintaining protective clothing and equipment. If no such instructions for washables, use detergent and hot water. Keep and wash protective clothing and equipment separately from other laundry."

User safety recommendations

- "Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet."

The following user safety recommendation is required for all end-use products EXCEPT those formulated as dog/cat collars:

- "Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing."

The following user safety recommendation is required only for those end-use product where PPE (other than long-sleeve shirt, long pants, shoes and socks) is required on the end-use product label:

- "Users should remove protective clothing and equipment immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing."

References:

1) Toxicology Endpoint Selection Document for Chlorpyrifos - Dated August 15, 1994.

2) Memorandum from A. Levy (TB-I) to L. Propst (SRRD) titled "CHLORPYRIFOS - Human Oral and Dermal Absorption", dated March 6, 1995.

3) Wright, C.G., R.B. Leidy, and H.E. Dupree (1984) Chlorpyrifos and Diazinon Detection on Surfaces in Dormitory Rooms. Bull. Environ. Contam. Toxicol. 32:259-264.

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5) Vaccaro, J.R. (1986) Evaluation of Airborne and Whole Body Exposure of Lawn Care Specialists to Chlorpyrifos During Routine Treatment of Turf. Accession No. 400260-01

cc: John Redden RCAB/HED
Dennis McNeilly /SRRD
Chlorpyrifos Chemical File (059101)

13544

R058756

Chemical:	**Chlorpyrifos**
PC Code:	**059101**
HED File Code	***12000 Exposure Reviews***
Memo Date:	**03/07/96 12:00:00 AM**
File ID:	**DPD203766**
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